Decarb Lunch Series





Decarbonizing a Historic Vancouver Skyscraper - The Business Case

Mon Sep 16, 2024, from 12 - 1pm PDT Free Webinar I zebx.org

















ZERO EMISSIONS INNOVATION CENTRE

ZCIC 'S **BUILDING** DECARBONIZATION TEAM













Decarb Accelerator Initiative

BOMA BC has recently launched an extraordinary new program that provides hands-on support for commercial buildings, whether they are embarking on or maturing their decarbonization journey.







The Business Case for Decarbonizing a Historic Vancouver Skyscraper

Stephanie Poole | SES Consulting Kit Milnes | KingSett Capital Sept 16, 2024

PRESENTATION AGENDA

01	An Effective Business Case For Decarbonization
02	The Business Case for Arthur Erickson Place Decarbonization
03	AEP Zero Carbon Plan Update
04	Additional Resources



BUILDING AN EFFECTIVE BUSINESS CASE

Good vs. Bad Decarbonization

- » The business case for a bad decarbonization project will always be poor
- » Bad decarb erodes confidence and shuts down the conversation

Cost Estimates

» What should you include?

Metrics

» What metrics are you presenting and using to compare measures?

External funding sources

» Bring the strategy and the capital and confidence skyrockets

GOOD vs. BAD DECARBONIZATION

GOOD DECARB	BAD DECARB
Increases efficiency, reduces energy and emissions	Reduces GHGs, but minimal or no efficiency gains or energy savings
Right sizes equipment based on building performance data (trends, meters etc.)	Like for like equipment sizing
Holistic analysis and measure bundle – reduces waste, improves controls, looks at all building systems Ex. Control upgrades, air sealing, ASHP for hydronic system, coil upgrades, insulation	Just electrifies the gas equipment Ex. Electric boiler, electric DHW heater
Minimally more expensive than BAU	Prohibitively Expensive

LIFE CYCLE COST ANALYSIS (LCCA)

- Select a good decarbonization project bundle
- Include Carbon Costs
 - » Carbon Tax \$170/tonne by 2030
 - » Penalties \$350/tonne for emissions above the limit starting in 2026
 - » Social cost of carbon accounts for predicted carbon risks
- Improve Accuracy/Be conservative
 - » Include electrical costs (capacity upgrade, phase upgrade & internal infrastructure)
 - » Include maintenance savings/costs
 - » L2 or L3 study minimum include feasibility analysis
 - » Ensure equipment in study is right sized based on data, not like for like
- Changes in operating costs
- Iterate
 - » Constantly model performance, financials, emission factors, etc.

SOCIAL COST OF CARBON

Year	SCC/SC-CO ₂	SCM/SC-CH ₄	SCN/SC-N ₂ O
2020	\$247	\$2,107	\$69,230
2021	\$252	\$2,203	\$70,797
2022	\$256	\$2,300	\$72,364
2023	\$261	\$2,396	\$73,932
2024	\$266	\$2,494	\$75,499
2025	\$271	\$2,589	\$77,066
2026	\$275	\$2,687	\$78,633
2027	\$280	\$2,783	\$80,201
2028	\$285	\$2,880	\$81,760 INTERNAL CARB
2029	\$289	\$2,976	\$83,335

https://www.canada.ca/en/environment-climate-change/services/climate-change/science-research-data/social-cost-ghg.html

MEASURE COMPARISON METRICS

- NPV/Tonne
 - » Typically refers to the measure lifecycle costs (NPV)/ the lifetime tonnes of CO2e savings for the measure.
 - » Allows you to easily compare measures with different levels of impact (tonnes of GHG savings)
 - Do I electrify my gas boilers or my gas furnaces?
 - » Is independent of carbon price if the measure lifespans are the same
- · Compare BAU to decarb bundle



KINGSETT'S APPROACH TO DECARBONIZATION

Significant asset repositioning achieving:

50%

Reduction (minimum) in absolute carbon emissions vs. baseline

Prerequisites to Decarbonize:

- 1. Major mechanical must be at or near end-of-life
- **2.** The property must have real-time data for all major systems for at least one heating and one cooling season
- **3.** The property must be able to manage the capital premium to fuel switch and electrify
- **4.** The property must be located in a region that supports electrification or is on a trajectory to do so

KINGSETT STRATEGY TO GET THE YES

- · Start easy to build confidence
 - » Canvas portfolio for the easiest win (get exec BUY-IN)
- Find good decarb opportunities Set scope and boundaries (4 prerequisites)
 - » Sensitivity analyses, don't put all your savings in one basket
 - » The zero-carbon path must be within 5% of the BAU path
- Be conservative. Only account for what you can model
 - » Green premium? Maybe...
 - » Asset value growth? Improved operating income comes once you can renegotiate leases
- · Right size equipment
 - » Challenge status quo approach to mechanical replacements
- Find external financing to cover capital spend

ARTHUR ERICKSON PLACE

- 26 story office building (400,000 sq.ft) built in 1968
- Multi-ownership structure (KingSett, Crestpoint, Reliance)
- 2 gas fired boilers provide heating water
- 2 chillers & cooling towers provide chilled water
- 10 AHUs with heating & cooling coils
- Zone Systems: Induction units (cooling only) and reheat coils in ducts
- Delta controls building automation system, some remaining pneumatics
- Single pane windows

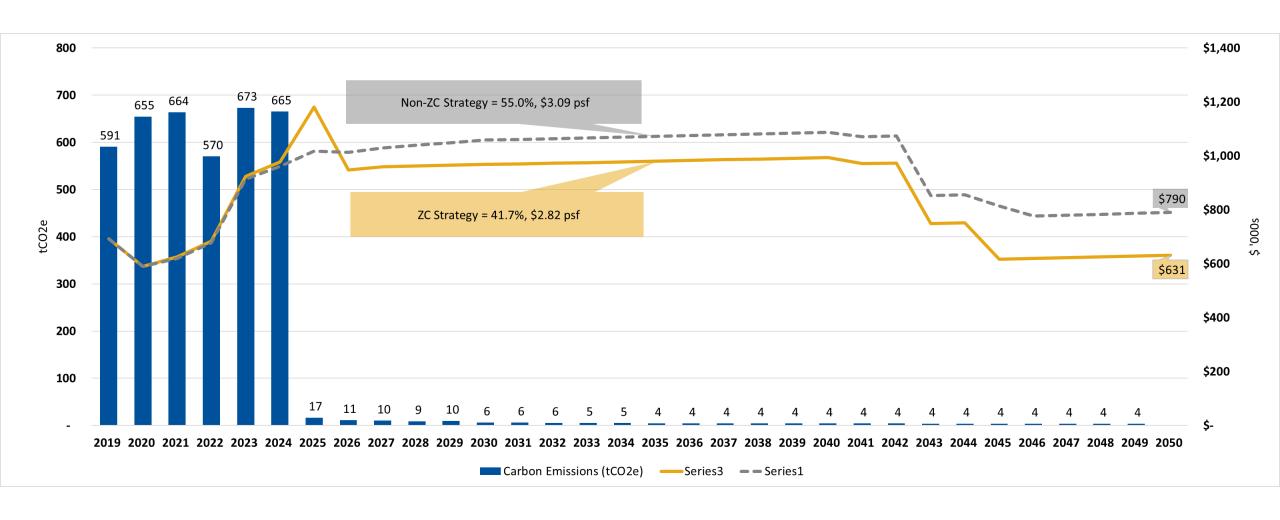


BUILDING THE BUSINESS CASE FOR AEP

- 1. Met all four prerequisites
- 2. Study various opportunities, right size and control capital spend
- 3. Set design/construction/commissioning team
- 4. Find capital funding sources loans, incentives, credits etc.
- 5. Present to asset management and investors/partners

Implement using integrated design process

· Reduce costs and increase efficiency



AEP DECARB BUNDLE CREATION

Retrofit Pathway	Incremental Cost	Incremental NPV	NPV
Existing Terminal Units	\$ 4,250,000	(\$ 1,735,900)	(\$ 159)
Terminal Heat Pump Upgrade	\$ 7,800,000	(\$ 4,294,200)	(\$ 350)
VRF Upgrade	\$ 11,250,000	(\$ 7,494,200)	(\$ 611)

	Item#	Measure	Annual Savings			Capital	Simple
	item#		Elec kWh	Gas GJ	\$	Cost	Payback
ſ	1	Glazing Replacement	388,200	3,381	\$ 50,898	\$ 6,057,764	119
	2	Glazing Film	143,600	901	\$ 16,117	\$ 430,000	27

AEP DECARB BUNDLE

Year 0

Domestic hot water (DHW) heat pump (HP)

Year 1

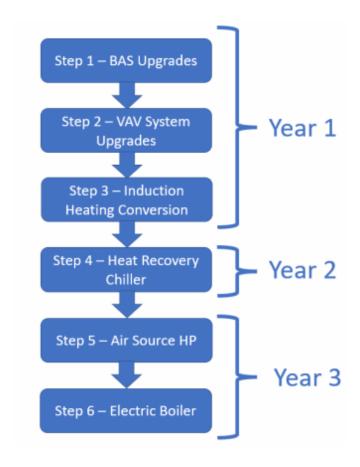
- Building Automation System Upgrades
- · Variable air volume (VAV) System Upgrades
- · Induction Unit Conversion

Year 2

Heat recovery chiller and air source heat pump

Year 3

· Electric boiler for remaining load



ARTHUR ERICKSON PLACE STATUS

- Completed the Zero Carbon Plan − V
- · CAGBC Zero Carbon Building Performance Certified **V**
- · Investor Ready Energy Efficiency (IREE) Certified V
- Secured External Funding at favorable rates V
- Year 0 − DHW Electrification − V
- Year 1 − **V**
- Year 2 In design phase (2025 execution)



KINGSETT LEARNINGS FROM DECARB PROJECTS

- · Were too conservative on efficiency gains
 - » Breakeven vs. 35% reductions
- · Water savings can be significant
 - » Ex. 80% savings in water (eliminate cooling towers drives deep water savings in office)
- · Plan for cost overruns
 - » Infrastructure upgrades/environmental abatement
- · Tenant Attraction and Retention
 - » Have had tenants sign/resign leases because of decarb plans



QUESTIONS?



MORE INFORMATION ON FINANCING

- · CIB Financing requires IREE certification
- · BMO Decarb Financing Options
- · SOFIAC
- · Incentives BC Hydro, CleanBC, FortisBC
- · Clean Technology Investment Tax Credit
- · Clean Buildings Tax Credit
- · Van City Commercial Retrofit Financing

MORE INFORMATION ON AEP

- · Zebx DHW Heat Pump Case Study
 - » https://www.zebx.org/decarbonization-of-a-commercial-domestic-hot-water-system/
- KingSett ZCB Performance Standard—
 - » https://www.kingsettcapital.com/about-us/news/vancouvers-iconic-arthur-erickson-place-achieves-zero-carbon-building-performance-standard-certification/
- · Globe and Mail ZCB Publication -
 - » https://www.theglobeandmail.com/business/industry-news/property-report/article-bringing-a-vintage-vancouver-building-into-a-zero-carbon-future/
- CBRE ZCB Publication
 - » https://www.cbre.ca/insights/articles/arthur-erickson-place-becomes-vancouvers-latest-retrofitted-zero-carbon-office-building
- GRESB Building Decarbonization Modelling Tool
 - » https://www.gresb.com/nl-en/building-a-decarbonization-modelling-tool/

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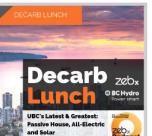
■ Domestic Hot Water Heat Pump

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The OSO Residential Development

Decarb Lunch: Nov 2022, The **OSO Residential Development**



Decarb Lunch: Oct 2022, UBC's Latest & Greatest: Passive House, All-Electric and Solar



Decarb Lunch: Sep 2022, Getting Unstuck: Homeowner and Contractor perspectives on home electrification



■ Building Enclosure

□ Solar Energy









Embodied Emissions

⊕ Stream 2

An applied research project for low-rise homes that minimize embodied emissions.

Utility Data

Stream 4

A ZEBx utility data collection initiative to determine the real emissions and energy profiles of BC homes.



ZCO_X

A Deep Retrofit in West Vancouver -A 1929 Home Leaps Ahead to 2032

Wed Sep 25, 2024 from 12 - 1pm PDT Free Webinar I zebx.org



WED OCT 16, 2024 FROM 5PM Ventura Room, 695 Cambie St, Vancouver clfbritishcolumbia.com





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